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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/688,541	10/16/2000	Kazuhito Shimoda	09792909-4652	3044

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EXAMINER

MARKHAM, WESLEY D

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 03/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/688,541

Applicant(s)

SHIMODA ET AL.

Examiner

Wesley D Markham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2001.
- 2a) ☐ This action is FINAL.
- 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 9-16 is/are pending in the application.
- 4a) Of the above claim(s) 1-4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 11 December 2001 is: a) ☒ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Acknowledgement is made of applicant's amendment B, filed as paper #8 on December 11, 2001, in which the title of the instant application was changed, proposed drawing changes were submitted, the specification was amended, Claims 5 – 8 were canceled, and Claims 9 – 16 were added. Claims 1 – 4 (non-elected) and Claims 9 – 16 are currently pending in U.S. Application Serial No. 09/688,541, and an Office Action on the merits follows.

Election/Restrictions

1. Acknowledgement is made of applicant's election to prosecute Group II, Claims 5 – 8, drawn to an optical component producing method. Claims 1 – 4 stand withdrawn from consideration pursuant to a restriction requirement.

Priority

2. Based on applicant's remarks in amendment B, the examiner withdraws the assertion that a claim for priority under 35 U.S.C. 119(a)-(d) cannot be based on the Japanese Application filed on Friday, October 15, 1999, as the instant application was timely filed on Monday, October 16, 2000.

Drawings

3. The proposed drawing correction and/or the proposed substitute sheets of drawings (i.e., for Figures 14 and 15), filed on 12/11/2001, have been approved. A proper

drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance. As such, the examiner's objection to the drawings, set forth in paragraph 8 of the previous Office Action, is withdrawn.

4. The Patent and Trademark Office no longer makes drawing changes. See 1017 O.G. 4. It is applicant's responsibility to ensure that the drawings are corrected. Corrections must be made in accordance with the instructions below.

INFORMATION ON HOW TO EFFECT DRAWING CHANGES

Correction of Informalities -- 37 CFR 1.85

New corrected drawings must be filed with the changes incorporated therein. Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin. If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may **NOT** be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

Corrections other than Informalities Noted by Draftsperson on form PTO-948.

All changes to the drawings, other than informalities noted by the Draftsperson, **MUST** be made in the same manner as above except that, normally, a highlighted (preferably red ink) sketch of the changes to be incorporated into the new drawings **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made, other than correction of informalities, unless the examiner has approved the proposed changes.

Timing of Corrections

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.185(a). Failure to take corrective

action within the set (or extended) period will result in **ABANDONMENT** of the application.

Specification

5. The objections to the disclosure, set forth in paragraph 9 of the previous Office Action, are withdrawn in light of applicant's amendment B and corresponding remarks.

Claim Objections

6. The objection to Claims 7 – 8, set forth in paragraph 10 of the previous Office Action, is withdrawn, as Claims 7 – 8 have been canceled.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. The rejection of Claim 8 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, set forth in paragraphs 12 – 14 of the previous Office Action, is withdrawn, as Claim 8 has been canceled.
9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

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The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 10 – 16 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically, new independent Claim 10, from which new Claims 11 – 16 depend, recites in part “controlling a thickness of no more than one layer...” This limitation encompasses the situation in which no (i.e., 0) layers have their thickness controlled. As the application as filed has no support for a situation in which no layers have their thickness controlled, this limitation is considered to be new matter. The examiner notes that this rejection can be overcome by limiting the thickness controlling step to exactly one layer instead of “no more than one layer”.
11. The examiner notes that the claim rejections under 35 U.S.C. 102(b) and (e), and 35 U.S.C. 103(a), set forth in paragraphs 16 – 28 of the previous Office Action, are withdrawn in light of applicant's amendment B, in which Claims 5 – 8 were canceled.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 10 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Bandyopadhyay et al. (USPN 5,648,115).
14. Regarding Claims 10 and 16, Bandyopadhyay et al. teach a method for forming an optical component, the method comprising depositing a plurality of optical layers on a base to form a surface, wherein the plurality of optical layers are alternately stacked optical layers different in optical characteristic (Col.1, lines 40 – 46, and Col.4, lines 43 – 54). Bandyopadhyay et al. do not teach controlling the thickness of any of the layers (i.e., they control the thickness of no more than one layer, i.e., 0 layers). Applicant's Claims 10 and 16 are open to this situation (see paragraph 10 above).

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
17. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Holland (USPN 4,311,725) in view of Rahn (USPN 5,483,378).
18. Regarding Claim 9, Holland teaches an optical component producing method for forming a multi-layer film, which is composed of alternately stacked layers different in optical characteristic on a base, the method comprising measuring an optical characteristic of the optical component obtained by forming the multi-layer film on the base, wherein the measurement step comprises the step of measuring the transmittance of the optical component, and controlling, on the basis of the measured optical characteristic of the optical component, a thickness of a portion of the multi-layer film to be formed on the base (Abstract, Col.7, lines 43 – 68, Col.8, lines 1 – 40). In the multi-layer film embodiment, Holland does not explicitly teach terminating the film formation when the measured transmittance of the optical component is changed to be decreased. In this embodiment, Holland teaches that

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the deposition is controlled to be terminated "at a required value". In addition, Holland also teaches that it is often a requirement to terminate deposition at a transmittance maximum or minimum, corresponding to a quarter-wave thick film, or a multiple thereof (Col.4, lines 21 - 25). The transmittance maximum is the point when the transmittance begins to decrease. Therefore, it would have been obvious to one of ordinary skill in the art to terminate the deposition of a portion of the multi-layer film of Holland when the measured transmittance is changed to be decreased as taught by Holland with the reasonable expectation of successfully forming a multi-layer interference filter having a quarter-wave thick film, as taught by Holland to often be a requirement. Holland does not teach removing a layer portion formed during a period of time from a time point when the increase/decrease of the measured light transmittance of the optical component is stopped (i.e., the transmittance maximum / minimum corresponding to a quarter-wave thick film as taught by Holland) to a time point when the measured light transmittance is changed to be decreased. In other terms, this process can be described as removing the "excess" portion of the film deposited after exactly a quarter-wave (or multiple thereof) thick film has been deposited. Rahn teaches that, in the art of depositing silica and titania multilayers for optical components (i.e., an analogous process to that of Holland), it was known at the time of the applicant's invention to remove a portion of the deposited film after deposition in order to provide the film with exactly the correct thickness (i.e., correct for errors in the "as deposited" film thickness) (Col.2, lines 20 - 32). Therefore, it would have been obvious to one of

ordinary skill in the art to perform the applicant's claimed removal process after the deposition process of Holland with the reasonable expectation of successfully (1) correcting errors in the "as deposited" film thickness, and (2) obtaining a film of exactly quarter-wave thickness (as taught to be desired by Holland) by removing the "excess" portion of the film deposited after exactly a quarter-wave (or multiple thereof) thick film has been deposited.

19. Claims 10 – 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over de Vrieze et al. (USPN 5,068,568) in view of Holland (USPN 4,311,725) and in further view of Rahn (USPN 5,483,378) and Nulman (USPN 5,754,297).
20. Regarding independent Claim 10, de Vrieze et al. teach a method for forming an optical component, the method comprising depositing a plurality of optical layers on a base to form a surface. Specifically, de Vrieze et al. teach a method of forming a multi-layer interference filter comprising a number of high-refractive index and low-refractive index layers alternately deposited on a base (Col.1, lines 13 – 64, Col.2, lines 33 – 41). The layers can be deposited by sputtering (Col.5, lines 46 – 50). In addition, de Vrieze et al. desire the layers to have a quarter-wave thickness (Col.3, lines 40 – 50, Col.4, lines 59 – 68). The number of layers is typically between 14 and 30 (Col.3, lines 40 – 43). De Vrieze et al. do not teach utilizing the applicant's claimed thickness controlling method. However, Holland teaches an analogous method of depositing a multi-layer interference filter on a base by sputtering in which the deposition can be terminated at a suitable thickness (Abstract, and Col.3,

lines 43 – 47). Holland also teaches that, in order to obtain a quarter-wave thick film (i.e., as desired by de Vrieze et al.), it is required to terminate the deposition at a transmittance maximum (i.e., when the transmittance begins to decrease) (Col.4, lines 21 – 25). This is done by monitoring the transmittance in order to discern when the transmittance maximum has been reached (Abstract) (i.e., measuring a first transmittance value, measuring a second transmittance value, determining if the transmittance maximum has been reached (i.e., if the transmittance value has decreased), and terminating the deposition only when this condition is met). It would have been obvious to one of ordinary skill in the art to utilize the thickness controlling method of Holland in the process of de Vrieze et al. with the reasonable expectation of (1) success, as both Holland and de Vrieze et al. teach analogous methods of depositing multi-layer interference filters on a substrate by sputtering, and (2) obtaining the benefit of utilizing the monitoring system of Holland, such as the ability to terminate deposition when a quarter-wave thick film has been deposited, as desired by de Vrieze et al. Neither de Vrieze et al. nor Holland teaches that the monitoring (i.e., thickness control) is performed for only one layer (i.e., applicant's "tuning layer"). However, Rahn teaches that, in the art of depositing an optical multi-layer film of alternating high and low refractive index layers (i.e., a process analogous to that of de Vrieze et al.), the optical characteristics of the multi-layer film are much more sensitive to the thickness of the high refractive index layers than to the low refractive index layers (Col.1, lines 39 – 56, and Col.2, lines 33 – 37). In addition, Nulman teaches that, in the art of monitoring the deposition of

films, it was known at the time of the applicant's invention that the number of times a process is monitored is determined by the level of process control desired (Col.5, lines 20 – 24) (i.e., it is a result / effective variable). Therefore, it would have been obvious to one of ordinary skill in the art to only monitor / control the thickness of one (e.g., any one) of the high refractive index layers of the interference filter of de Vrieze et al. (i.e., a "tuning layer") utilizing the monitoring method of Holland with the reasonable expectation of success and of obtaining similar results as compared to the situation in which all the layer thickness values are controlled, as Rahn teaches that the optical characteristics of the multi-layer film are much more sensitive to the thickness of the high refractive index layers than to the low refractive index layers, and Nulman teaches that the number of times a process is monitored is determined by the level of process control desired.

21. The combination of de Vrieze et al., Holland, Rahn, and Nulman also teach all the limitations of Claims 11 – 16 as set forth above in paragraph 20 and below, including a method wherein / further comprising:

- Claim 11 – Removing a portion of the tuning layer as claimed in Claim 11.

Specifically, Rahn teaches that, in the art of depositing silica and titania multilayers for optical components (i.e., an analogous process to that of de Vrieze et al.), it was known at the time of the applicant's invention to remove a portion of the deposited film after deposition in order to provide the film with exactly the correct thickness (i.e., correct for errors in the "as deposited" film thickness) (Col.2, lines 20 – 32). Therefore, it would have been obvious to

one of ordinary skill in the art to perform the applicant's claimed removal process after the deposition of the "tuning layer" of de Vrieze et al. with the reasonable expectation of successfully (1) correcting errors in the "as deposited" film thickness, and (2) obtaining a film of exactly quarter-wave thickness (as taught to be desired by de Vrieze et al.) by removing the "excess" portion of the film deposited after exactly a quarter-wave thick film has been deposited.

- Claim 12 – The tuning layer defines a refractive index that is higher than a refractive index of at least one optical layer of the plurality of optical layers (i.e., the layers below the tuning layer). See paragraph 20 above, which teaches the obviousness of only controlling the thickness of one of (i.e., any one of) the high refractive index layers in the multi-layer, alternating high and low refractive index layer, optical interference filter of de Vrieze et al.
- Claims 13 and 14 – Depositing at least one and no more than one (i.e., exactly one) optical layer on the tuning layer. See paragraph 20 above, which teaches the obviousness of only controlling the thickness of one of (i.e., any one of) the high refractive index layers in the multi-layer, alternating high and low refractive index layer, optical interference filter of de Vrieze et al. This would have included the high-refractive index layer having only a single layer deposited on top of it (Col.5, lines 1 – 8 and 25 – 45 of de Vrieze et al.).

- Claim 15 – The plurality of optical layers comprise at least nine optical layers, and the method further comprises depositing at least one optical layer on the tuning layer. Specifically, de Vrieze et al. teach a filter typically having between 14 and 30 layers (Col.3, lines 40 – 42), and it would have been obvious to one of ordinary skill in the art to control the thickness of any one of the high refractive index layers (i.e., including a layer having at least one layer deposited on top of it) for the reasons set forth in paragraph 20 above.
- Claim 16 – The plurality of optical layers are alternately stacked optical layers different in optical characteristic (Col.1, lines 13 – 64, Col.2, lines 33 – 41 of de Vrieze et al.).

Response to Arguments

22. Applicant's arguments with respect to Claims 9 – 16 have been considered but are moot in view of the new ground(s) of rejection presented above.


Conclusion


23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (703) 308-7557. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

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24. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.
25. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Wesley D Markham
Examiner
Art Unit 1762


WDM
March 20, 2002


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